Scientific Content: Language Expansion in Bibliometric Databases

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Abstract. The study presents the results of the analysis of the scientific content of the bibliometric database Scopus in the aspect of English-language expansion. A sample of 211 journals indexed in the Library and Information Science (LIS) subject area during 2018 was formed. The study of the content coverage of the Scopus database involves to identify metadata of selected scientific journals (country of origin, publisher, the language, quartile, type of access to content) and to determine geographical coverage of scientific content within the LIS subject area, publishers and their representation within the sample, percentage of non-English publications and multilingual publications from the total number of journals, the linguistic diversity of scientific content (English content, English & non-English content, non-English monolingual content, non-English multilingual content) within the LIS subject area. English-language content occupies a dominant position in the 1st quartile. As the ranking positions move to lower levels, we see a clear tendency to reduce the share of English-language content and increase the share of content in national languages. In total, within the sample of LIS content, scientific journals in English acquired the highest performance. At the same time, there are journals, which present scientific content in other European languages. The study gives grounds to claim that the content of bibliometric databases has established a tendency to English-language expansion. This poses a danger of ousting national languages from international scientific circulation.

Keywords: bibliometric database, scientific content, language of science, national language, functional styles, language expansion, globalization

1 Introduction

The processes of globalization affect all spheres of public life. The high level of development of science and technology in English-speaking countries, presentation of

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research results in English-language journals, the scientific authority of which is confirmed by inclusion into international bibliometric databases, has radically changed the status of the English language. Scientific communication at the international level has been strongly influenced by the English language, which has undoubtedly been recognized as the language of science. These processes led to a change in the status of national languages, the establishment of hierarchical relations in which national languages have peripheral positions. This situation is the basis for the contradiction between the status of English and other national languages. The dominance of the English language in scientific communication gives advantages to English-speaking researchers. This discriminates against their colleagues who publish research results in their native national languages. Multilingual researchers face significant obstacles and additional requirements for publishing their work in a foreign language. Publication of research results in the national language (based on which these studies were performed) and subsequently in English is considered an ethical violation. The global displacement of national languages from the sphere of international scientific circulation limits the presentation of national achievements of science and culture in organic combination with the national language. Positioning the status of national languages as regional also affects the political and economic balance of power in the world.

2 Methodology

The basis of the research methodology are methods of analysis and synthesis, statistical method, grouping, comparison, descriptive method. Analysis and synthesis were used to determine Scopus Content coverage during 2018 in the Library and Information Science subject area. The statistical method was used for statistical processing of data collected as a result of the content analysis of scientific journals within the formed sample. The grouping method was used to form groups of scientific journals on common grounds (country of origin, publisher, the language of publication, quartile, type of access to content) for their further comparison and analysis. The method of comparison was used for a comprehensive analysis of statistical indicators of scientific content and the establishment of certain patterns. The descriptive method was used to interpret and present the results of the study of linguistic aspects of filling the bibliometric database Scopus.

The study of the content coverage of the Scopus database involves the following stages:

- formation of a general sample of scientific journals by LIS subject area;
- identification of metadata of selected scientific journals: country of origin, publisher, the language of publication, quartile, type of access to content;
- grouping within the formed sample of scientific journals according to the identified metadata;
- analysis of a formed sample of journals in general and individual groups of journals by identified metadata to determine:
 - geographical coverage of scientific content (country of origin) within the LIS subject area;

- publishers and their representation within the sample;
- determine the percentage of non-English publications and multilingual publications from the total number of journals;
- the linguistic diversity of scientific content (English content, English & non-English content, non-English monolingual content, non-English multilingual content) within the LIS subject area.

English content is defined as the content of a scientific journal presented entirely in English. English & non-English content is defined as the content of a scientific journal presented in both English and other languages. Non-English monolingual content is defined as the content of a scientific journal presented in a single non-English language. Non-English multilingual content is defined as the content of a scientific journal presented at the same time in several languages, among which there is no English.

3 Related Works

3.1 Academic communication and status of English language

Current trends in academic communication are evidenced by such manifestations of language dominants as the IMRaD format, CLIL learning technologies and English academic authoring centres. These phenomena have been studied using empirical sociological methods: in-depth interviews with experts, observation of participants and meaningful research of works indexed in Scopus. It has been shown that English-speaking societies use the global distribution of the English language to promote their competitive advantages in science. The introduction of English language teaching in higher education and English-language models in scientific communication - especially in terms of presenting research results - can have a negative impact on both the development of researchers' competencies and their further effectiveness in advancing science. The dominance of the English language in scientific communication of all participants in scientific communication, including high school teachers, poses potential threats. There is a need for increased awareness of these sociolinguistic processes, the negative impact of which can be eliminated using bilingual and bicultural educational approaches [14].

The use of published scientific works in pedagogical activity is analyzed in the following aspects: by formal characteristics of publications (year, author, periodicals, countries of origin of authors) and by the content of research (epistemological bases, methods of application and language of scientific content). Combined searches for scientific articles written in English, Portuguese and Spanish were used using the Web of Science, Scopus, Science Direct and SciELO databases. A total of 494 researchers were recorded. It is established that 81% of the content is presented in English. The USA, South Africa, Brazil, Canada and Australia were the countries of origin of the first author for the majority (64%) of the considered works [20].

3.2 The language of scientific content indexed in Scopus and Web of Science

Peer review has existed for centuries as a recognized process for reviewing manuscripts submitted for publication in scientific journals. Today, indexing in bibliographic databases provides a high level of journal quality. By the 2020 Scopus, bibliometric database produced by Elsevier, includes more than 22,800 scientific serial titles. Some of the proposed journals are devoted to niche areas and are published in languages other than English. To ensure a fair and transparent evaluation of these titles and to meet the growing interest in indexing, Scopus has redesigned the entire journal evaluation process based on a metric scoreboard and peer-review principles. By developing an online editorial system, the Scopus Title Rating Platform (STEP), Scopus has also created a prerequisite for improving communication with publishers and editors about its journals [9].

The productivity of publishing scientific content indexed in Scopus and Web of Science during 2003-2014 was studied based on indicators: number per year, author, language, institutional sector, number of journal articles, keywords. The content of the articles in the sample was analyzed. The results of the study allow characterizing the main trends of the scientific process over the last decade: research topics; most productive authors and journals. The most relevant authors were from academic institutions, mostly American, Spanish and Brazilian. The most productive journals were published in English, only a few in Spanish and Portuguese. The study found stability in the publication of scientific content in the following main areas: evaluation of resources, collections, services and products; quality management; meeting the needs of users; use of evaluation standards and tools (EFQM, LibQual, ServQual). The productivity of publishing scientific content indexed in Scopus and Web of Science reached its highest levels in 2005-2009 and 2011-2014. This may be due to the deployment of evaluating the publishing activity of researchers in university libraries in the context of quality management [5].

A study of open public search engine for scientific publications Microsoft Academic (MA) compared its coverage with two databases, Scopus and Web of Science. It was found that the MA largely covers journal articles, working papers and conference proceedings and indexes more types of documents than databases (working papers, dissertations). MA outperforms Scopus and WoS in the coverage of book types of documents but lags slightly behind Scopus in terms of journal articles. The MA is adapted for evaluative bibliometrics in most fields of science, including economics / business, computer / information science, and mathematics. However, the MA is biased, like Scopus and WoS, in the humanities, non-English and open access publications [8].

The state of the scientific content on podcasting and radio on the Internet [23], published in the most-cited journals indexed in Scopus and Web of Science, has been studied. Based on the methodology of a systematic review of the literature, hypotheses related to the number of published articles, journals and countries of publication, the language of the articles, the affiliation of the authors are formulated. The initial search resulted in 91 articles, of which only 28 corresponded to the

research topic. Almost all articles are written in English and published in English-speaking countries [6].

Scientific works containing the words "organizational stability" included in Scopus in 2005-2014 have been studied. 21 articles were analyzed by indicators: year, original language, scientific journal, keyword, number of authors per article, number of works per author, institutional affiliation, country of communication and international cooperation. It was found that the published articles were mostly written in English by two authors, and the United States was a country with a higher concentration of authors [16].

Publishers' rating survey, based on two citation resources from Elsevier (books cited in Scopus journals (2007-2011) and relevant metadata from WorldCat®, ie OCLC numbers, ISBNs, publisher records and library records), is the basis for creating unique relational databases. The research was carried out in 3 stages: 1. A rating of the 500 best publishers was built and descriptive statistics of the type of publisher (university, commercial) and country of origin were performed. 2. The 50 best university and commercial publishing houses were identified on the basis of citations. 3. A map of the direction of citations between journals and book publishers has been created. American and British publishers tend to dominate the work of library collection managers and refer to scholars as well as specialized European publishers. Other clusters from the citation map indicate a degree of regionalism when journals published in other national languages (non-English) seek to cite books published by the same national press [22].

The change in Web of Science editorial policy has increased the number of LA-C indexed journals from 69 to 248 titles in just four years (2006-2009). In the LA-C region, Brazil grew the most in Web of Science production, corresponding to a significant increase in publications in national indexed journals. Scopus has also significantly expanded the coverage of the LA-C journals. Therefore, Portuguese has acquired the status of the second scientific language (after English) in the LA-C segment in Web of Science. Although Brazilian publications in national journals account for about a quarter of all Web of Science publications with low citation rate. The other LA-C countries represented in Web of Science also show very low levels of publication activity and citations [4].

3.3 Publication of research results and English-language expansion

Research and descriptive analysis of the national orientation of scientific content is performed in two aspects: the affiliation of publishers and citations of authors. For journals indexced in Scopus: calculated National Orientation Index (INO); the distribution of INO values by disciplines and countries is determined; the relationship between INO values and journal influencing factors is established. The international status of the journal is not crucial for its national orientation and its influence on citations. Journals published in English do not necessarily have an international orientation in terms of publisher affiliation or citation of authors. In the social sciences and humanities, the United States also has its own nationally oriented content. About 40 per cent of the nationally oriented journals included in Scopus in previous years have become more international in recent years. The use of English as the language of publication and open access status are determinants [13].

To study the evolution of language priorities during the publication of scientific content, a database was created with complete bibliographies of all professors who have worked in Belgium in the field of geography over the past 40 years. Based on a quantitative analysis of 810 articles published in 304 different journals, it was found that geographers from the Dutch-speaking north of the country now publish more in English-language journals and Web of Science indexed journals than their counterparts in the 1970s and 1980s, and less in Dutch and French. languages and in Belgian geographical journals. In the French-speaking south of the country, this trend is less pronounced, but it exists. The tendency to publish in English and is positive, as it increases the academic rigour of scientific content. However, this hinders the involvement of research in the teaching of geography and the functional development of the national language [17].

When publishing articles in international journals, scholars for whom English is an additional language are under increasing pressure and face serious language barriers. Recourse to translators does not always solve the problem, as the quality of the translation of the manuscript can be challenged. Translation of scholarly manuscripts for which English is an additional language is an important service provided the set of circumstances is correct, for example by working with ERPP teachers (English for research and publication purposes) [10].

Changing the model of publishing activity related to the introduction of funding for publications in specific journals is in the focus of Finnish researchers. The scientific community is concerned about the growth of publications by Finnish scientists in international (English) journals in the social sciences, and to a lesser extent in the humanities. Directing publishing activity to English-language journals and, consequently, narrowing the segment of content in the Finnish language can have long-term consequences for both the Finnish academy and society [11].

Mapping of open access scientific content in the UAE covers international and national sources. The set of indicators that form the picture of open access scientific journals includes: languages of publication, disciplines and type of publisher. It is established that UAE journals are published mainly in English, the number of journals in Arabic is insignificant. The most common topics of journals: science, technology and medicine. Commercial publishers control most publications, especially in the medical field: about 75% of UAE journals charge a fee for publication [3].

The important role of English as a means of communication, especially in science, is reflected in the growing number of English-language academic journals in non-English-speaking countries: China, India and Spain, as well as in peripheral countries, including Thailand. This situation leads to competition between the national language and English. The choice of the language of scientific content published in Thai national journals in two main areas: scientific journals and humanities and social science journals. The data collection includes 663 articles published in 2005 and 2015, including 346 from Science and 317 from Humanities and Social Science. English is more common in scientific journals than in the humanities and social sciences. In addition to language choices in Thai academic journals, a survey of 73 respondents to study the language priorities of Thai researchers was also distributed, indicating that they choose English to write articles due to the lack of special technical terms in Thai. At the same time, some researchers prefer Thai because of their focus on Thai consumer of information [15].

Personalized research is conducted on the attitude of researchers to the status of English as a language of academic writing, on the problematization of the concept of "privilege", which is usually attributed to English-speaking researchers. The positions of six young Swedish scholars studying English linguistics and political science have been explored. Issues are considered: attitude to language; the role of access to scientific networks and journals' quality for the publication of articles as one of the key factors in the formation and development of young scientists; providing the opportunity to publish articles in reputable journals [19].

3.4 Ethnoscience and the status of national languages

The national language of scientific content and regional studies

Most modern research on scientific communication in geography has addressed the English-language flow of scientific information, almost completely ignoring the content published in other languages. The study of French, German and Spanish journals indexed in the Scopus database represents an analysis of the countries of origin of the authors of the articles and the authors who cite them. The analysis shows that French, German and Spanish geographical journals are used almost exclusively for scientific communication in their own country and within their native language. They have an even higher level of "secrecy" than English-language journals published in Anglo-American countries. Therefore, they cannot be considered as international media in geography, as they publish articles in national languages – French, German or Spanish [2].

Raising the status of ethnoscience through entering the English-speaking space is a stable trend today

Based on the Google Scholar information search system, citations of Polish geographical journals published in 1918-2008 were studied. Google Scholar's universal bibliometric availability range allows to index not only publications that are included in the indexes of the Institute of Scientific Information in Philadelphia or Scopus, but also more accessible collections, including journals published in Central European countries in national languages. The impact of the achievements of Polish geography on the discipline in the world as a whole is insignificant. Accordingly, the status of the Polish language as a language of academic writing in the world is determined. To disseminate Polish scientific content on geography, it is advisable to create professional websites for publishers on geography, which would cover the content, summaries, abstracts in English, along with search engines that can be registered in the world bibliographic database. Geographical publications are beginning to lose the competition with influential English-language journals, in which scholars are increasingly seeking to publish [18].

Development of modern terminology in the national language

Research on the identification of public disposition on social media content was conducted on the basis of publications on the development of Sentiment Analysis (SA), published in Chinese and English. However, SA's research on other languages is limited. The need to build SA research specifically for the Malay language was realized by analyzing published 2433 scientific articles on SA in Malay from five online databases: ACM, Emerald insight, IEEE Xplore, Science Direct and Scopus. In addition, 10 articles were selected for review through PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). These articles were organized into categories. The analysis helped to systematize and standardize SA terminology in Malay [7].

3.5 Publication activity and language learning

Japanese scientists are among the largest producers of scientific content in the world. They actively publish scientific articles in English, using proofreading as a general strategy for overcoming errors in foreign texts. To qualitatively present the results of scientific research in English, to identify and correct errors, Japanese scientists use the Error Analysis (EA) framework, developed using functional descriptions of Systemic Functional Linguistics (SFL) [12].

The use of English as a language of science has become widespread in Tunisia, although researchers have doubts about the neutrality and ideological detachment of English as the language of scientific content. Tunisian scholars have a positive attitude to the use of English to describe research results, to publish articles in English journals. However, this practice poses language challenges, as Tunisian scholars do not have adequate linguistic training in English. Alternative strategies are being developed to meet the growing needs for English language training, including the creation of English for Research Publication Purposes (ERPP) courses [1].

3.6 Observance of ethical norms and language of scientific content

In the highly competitive market of scientific and academic publications, the issue of compliance with ethical norms regarding undeclared duplication of a publication or its part, which is considered an ethical violation, is relevant. Depending on the amount of duplication, the amount of necessary correction is determined - either to correct the error or to revoke the publication. The number of submissions to the publication of English-language articles that have been corrected or revoked as a result of undeclared prior publication in another journal and in another language is growing. Duplicate publications are used by non-native English speakers who publish articles in their native language in journals whose main language is not English. Reduces the risk of ethical breach of references to already published similar materials (data, text, ideas, concepts, methodologies, analyzes) in the journal in another language [21].

4 Results

According to the defined research methodology, a sample of 211 scientific journals, which are indexed during 2018 in the bibliometric database Scopus in the subject area Library and Information Science (LIS), was formed. The analysis of metadata of the selected scientific content was carried out according to the following: country of origin, publisher, the language of publication, quartile, type of access to content.

Geographical coverage of scientific content in LIS subject area of Scopus database. Defining the countries of origin of journals allows forming a map of the geographical diversity of scientific content indexed within the LIS subject area (see Fig. 1).



Fig. 1. Number of titles in LIS subject area by the countries of origin

The absolute monopolists of all countries of origin of scientific content are the United States and the United Kingdom, which produce more than half of all scientific journals in LIS (34 % and 28 % respectively). The dominance of English-speaking researchers a priori defines English as the dominant language of LIS scientific content.

Publishers and their representation in LIS subject area of Scopus database. Analysis of the publishers and their representation within the sample shows that there are four groups of them: academic publishers, universities, research institutions, scientific associations and societies. The largest part of LIS scientific content belongs to academic publishers, which are commercial organizations. Top publishers include Taylor & Francis, Emerald, Springer Nature, Elsevier, SAGE, Brill, Walter de Gruyter and Wiley-Blackwell (see Fig. 2).



Fig. 2. Types of the publishers represented in LIS subject area

Linguistic diversity of scientific content in LIS subject area of Scopus database. The language of presentation of scientific content is an important aspect not only in the context of meeting the information needs of consumers of information but also in the emergence of barriers of presenting scientific content by non-English researchers in conditions of English status as an academic language. The emergence of a language barrier to the dissemination of new scientific knowledge for researchers in the field of LIS can be laid at the stage of filling the Scopus database. The results of the analysis of the language coverage of scientific content show that 84 % of LIS journals are entirely in English, which includes not only English-speaking countries. Only 16 % of LIS journals presents scientific content in national languages (see Fig. 3).



Fig. 3. Language coverage of LIS subject area

Thus, a comfortable segment for publication in the native national language are journals representing English & non-English content (6 %), non-English monolingual content (8 %), non-English multilingual content (2 %). However, it should be noted that the number of national languages represented in the LIS is limited. Such national languages are Spanish, French, Portuguese, German, Italian, Turkish, Estonian, Catalan, Croatian.

Exploring the linguistic aspect of the coverage of LIS scientific content by quartiles has shown that the representation of national languages in different quartiles is diverse (see Fig. 4).



Fig. 4. Language distribution of scientific content of LIS subject area by quartiles

Consider the representation of national languages in each of the four quartiles. 1st Quartile (Q1) covers most rated and citable journals, where almost all English-

language content is concentrated. The only exception is the journal Professional de la Informacion, which publishes articles only in Spanish.

2nd quartile (Q2) covers mostly English-language content, but there is a clear trend towards an increase in the share of content in national languages and their diversity. These include French, Spanish, Portuguese and German. The dominant national language is Spanish.

3rd quartile (Q3) shows a deepening trend towards a decrease in the share of English-language content and an increase in the share and diversity of national languages. These include French, Spanish, Portuguese, German, Estonian, Italian and Turkish. The dominant national language is French.

4th quartile (Q4) covers 50% of the scientific content in national languages. These include French, Spanish, Portuguese, German, Catalan, Italian, Turkish, Croatian. The dominant national language is Spanish.

In terms of the convenience of meeting the information needs of consumers of scientific information, Open Access journals occupy an important place. Therefore, it was interesting to establish a correlation between the number of Open Access journals and the language of their content (see Fig. 5).



Fig. 5. Correlation between the number of Open Access journals and the language of their content

Thus, non-English-language Open Access journals account for only 37%. Of these, 26% are journals that present content only in national languages.

5 Conclusion

English-language content occupies a dominant position in the 1st quartile. As the ranking positions move to lower levels, we see a clear tendency to reduce the share of English-language content and increase the share of content in national languages.

In total, within the sample of LIS content, scientific journals in English acquired the highest performance – 192 journals. At the same time, there are journals, which present scientific content in other European languages. These include Spanish (15 magazines), French (12), Portuguese (7), German (5), Italian (4), Turkish (2), Estonian (1), Catalan (1), Croatian (1).

The study gives grounds to claim that the content of bibliometric databases has established a tendency to English-language expansion. This poses a danger of ousting national languages from international scientific circulation.

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